

DISTRIBUTION OF FOUR INTRODUCED
CONODERUS SPECIES IN CALIFORNIA
(COLEOPTERA: ELATERIDAE)

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ABSTRACT

The present distribution in California is discussed for 4 introduced species of *Conoderus*, the larvae of which are destructive pests of vegetable crops in other areas.

Since 1950 adults of 4 imported species of *Conoderus* have become increasingly abundant in California as indicated by their recovery at lights and their presence in State and University collections. Two species, namely *Conoderus falli* (Lane) and *Conoderus amplicollis* (Gyll.), have been destructive for years in the southeastern States and presently are under investigation to determine their biology and importance (Day et al. 1971 and Cockerham et al. 1936). *Conoderus exsul* (Sharp) was described from New Zealand and has been present in Hawaii since 1916; it was first reported from California by Graves (1938).

Little is known of the potential destructiveness of these introduced wireworm species in California. Nevertheless, in view of their already widespread distribution and the fact that Day et al. (1971) found that *C. falli* had become resistant to certain soil insecticides in the South, emphasizes the importance of checking reports of wireworm injury to vegetable and potato crops. Growers in the western States for over 50 years have been well aware of the destructiveness of the sugar-beet wireworm (*Limonius californicus* (Mann.)) to beans, sugar-beets, potatoes, corn, and many root crops (Stone 1941). In the last 20 years damage has been greatly reduced due to the use of soil insecticides and soil fumigants.

The purpose of this paper is to present the known distribution of these *Conoderus* species in California based on information accumulated to date.

Conoderus falli (Lane)

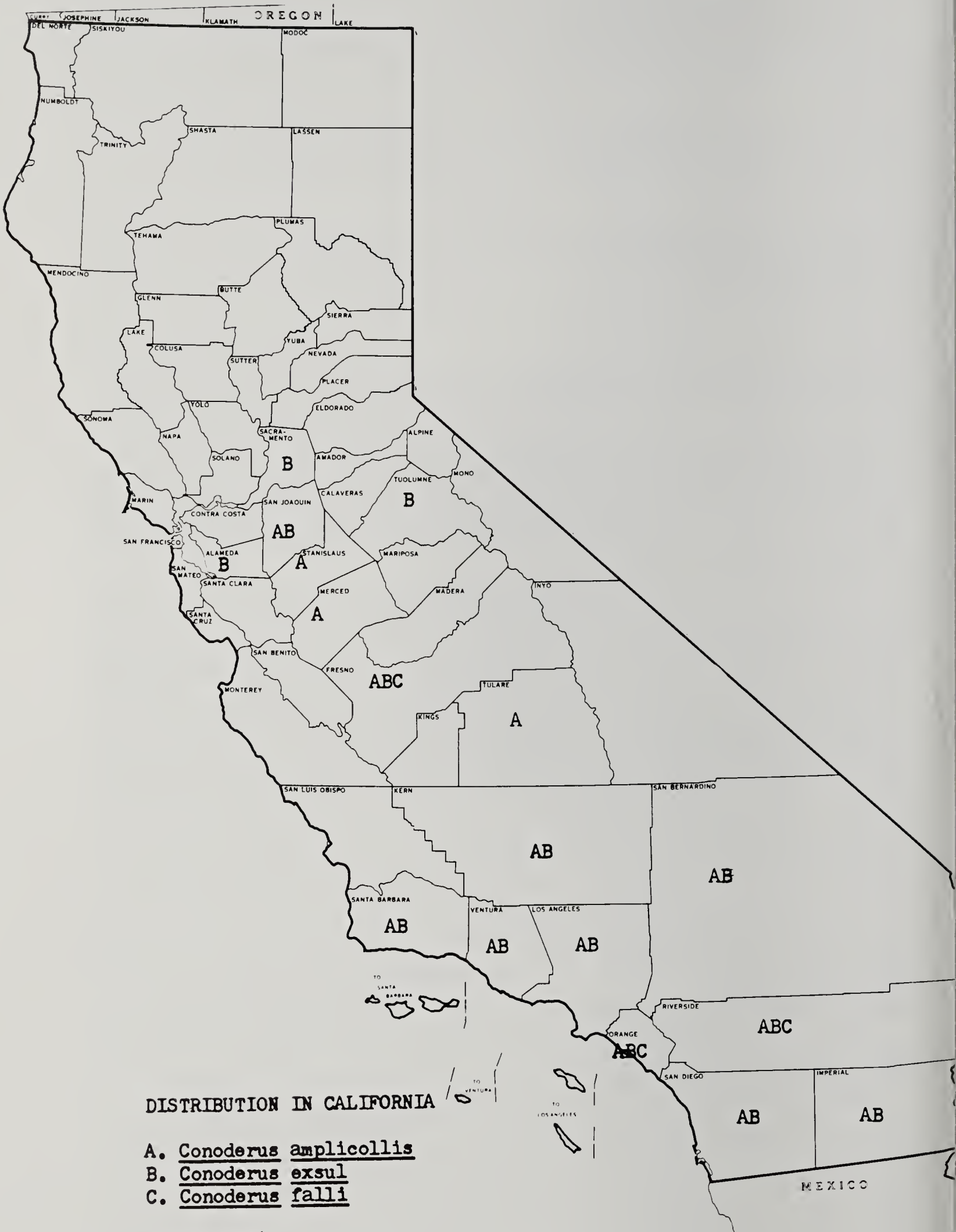
Heteroderes vagus Candeze, 1893, Argentina (nec *Monocrepidius vagus* Candeze 1888).

Monocrepidius difformis Fall, 1927, Georgia (nec *M. difformis* Fleuteaux, 1920).

Monocrepidius falli Lane, 1956.

Conoderus falli (Lane) 1956.

Dean and Cuthbert (1955) found the southern potato wireworm *Conoderus falli* (Lane) to be most destructive to potato and vegetable crops in southeastern U. S. The pest was introduced into the U. S. from South America and was collected for the first time near Savannah, Georgia in 1927. Their surveys showed that it had spread along the south Atlantic and Gulf coasts from North Carolina to Louisiana. Lane (1954) also reported on the distribution of this species; later it was given the common name, southern potato wireworm. This species was described from Argentina (as *vagus*).



In California, *Conoderus falli* was first collected in May 1963 by E. L. Schlinger in Deep Canyon near Palm Springs. Its spread was rapid, much larger numbers being collected at Indio and Riverside in 1966. In 1973 at Riverside I collected 302 adults at a blacklight at intervals from 15 May to 15 October, the peak collections being obtained in September when day temperatures reached 95 to 100° F. Except for a single adult collected in Fresno County in 1970 it appears to be restricted to Riverside and Orange counties.

Conoderus amplicollis (Gyllenhal)

Conoderus amplicollis (Gyllenhal) 1808 (Island of St. Bartholemy, south of Puerto Rico)

Conoderus laurentii (Guerin-Meneville) 1838

Heteroderes nichols; Notman, 1922 (Florida).

Conoderus fuscus (Blatchley) 1925.

Conoderus planidiscus (Fall) 1929 (Georgia)

Heteroderes laurentii Guer., now known as *Conoderus amplicollis* (Gyll.) or Gulf wireworm, was first noted as a pest of potatoes and vegetable crops in southeastern U. S. in 1927. Cockerham and Deen (1936) studied its distribution and biology. Lane (1954) reported that it was distributed along the Gulf Coast from Florida to Houston, Texas and north along the Atlantic Coast to Charleston, South Carolina. *Conoderus amplicollis* is widely known in South America and the West Indies.

In California, adults were first collected 10 July 1938 by E. S. Herald at Huntington Park, adjacent to Los Angeles. He also recovered larvae feeding on grass roots. My attention was called to wireworm injury to pansies in the same area, and the larvae reared to adult were identified by E. C. Van Dyke as *Conoderus amplicollis* (Gyll.). Adults were collected at South Gate in 1942 and at San Marino, both Los Angeles County, in 1944. Many specimens were collected at light in Riverside in 1947 by P. H. Timberlake. In the San Joaquin Valley, specimens were collected at Porterville July 1951 and at Fresno in 1967; and at Bard (Imperial County) in 1959.

In April 1957 I observed young cabbage plants damaged by larvae in a field near Buena Park, California. When reared these larvae transformed to adult *C. amplicollis* in July. Adults have now been collected in 25 locations in 13 counties in California. The counties now infested are shown in Figure I.

Conoderus exsul (Sharp)

Conoderus exsul (Sharp 1877) (New Zealand)

Conoderus bicarinatus Van Dyke 1932 (Arizona) (nec *C. bicarinatus* Reitter 1891)

Conoderus arizonicus Van Dyke 1939 (proposed as a new name)

Conoderus duplicatus Van Dyke 1943 (proposed as a new name)

An adult of the sugarcane wireworm, *Conoderus exsul* (Sharp), was collected by H. W. Graves in Alameda, California in July 1937. Larvae were also found feeding on grass roots. Williams (1931) reported that the insect is largely carnivorous but feeds on sugarcane shoots in the Hawaiian Islands. Lane (1954) reported that adults of this species were collected in Sacramento, Fresno, Los Angeles, Riverside, and San Diego counties.

Adults have now been collected in all counties of southern California and in addition, in San Joaquin and Tuolumne counties in central California. In the southern portion of the State the first adult was collected at Anza in Riverside county 25-VI-1949. Numerous specimens were collected in San Diego in 1954, in Ojai (Ventura Co.) in 1955, and in Santa Barbara in 1961. Sizeable collections were made in Orange Co. in 1966 by J. Wilcox. At Riverside in 1973 I collected adults periodically at a black-light from July through October, the peak collection of 38 adults between July 1 and 15. Figure 1 shows California counties in which *Conoderus exsul* adults have been collected.

Conoderus bellus Say

Lane (1954) reported that *Conoderus bellus*, a pest of tobacco east of the Mississippi, had been collected at lights at Riverside in 1953 and at San Diego in 1952. Also he had a series collected in 1924 from Los Angeles which he thought may have been mis-labeled. I have collected this species at Riverside every year since 1965 and also have specimens from Orange, Los Angeles, Yolo, Sacramento and Fresno counties. Specimens have also been obtained from Tempe and Tucson, Arizona and from various locations in Mexico. This species is generally unnoticed because of its smallness, and its damage may be mistaken for injury by larvae of flea beetles.

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LITERATURE CITED

- COCKERHAM, K. L., and O. T. DEEN. 1936. Notes on life history, habits, and distribution of *Heteroderes laurentii* (Guer.) J. Econ. Ent. 29:288-296.
- DAY, A., F. P. CUTHBERT, JR., and W. J. REID. 1971. The southern potato wireworm. U S D A Tech. Bull. 1443:1-33.
- DEEN, O. T., and F. P. CUTHBERT, JR. 1955. The distribution and relative abundance of wireworms in potato growing areas of the Southeastern States. J. Econ. Ent. 48:191-193.
- GRAVES, H. W. 1938. A Hawaiian elaterid introduced into California. Pan-Pacific Ent. 14:91.
- LANE, M. C. 1954. Distribution of several introduced species of wireworms. U. S. Plant Pest Control Branch, Coop. Insect Rept. 12:243.
- LANE, M. C. 1956. New name for an economic wireworm. J. Kansas Ent. Soc. 29:35-36.
- STONE, M. W. 1941. Life history of the sugar-beet wireworm in southern California. U S D A Tech. Bull. 744:1-88.
- VAN DYKE, E. C. 1939. An exotic *Conoderus* new to California. Pan-Pacific Ent. 15:11.
- WILLIAMS, F. X. 1931. Handbook of the insects and other invertebrates of Hawaiian sugarcane fields. Hawaiian Sugar Planters Association, Honolulu, 400p.

